



# PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 46, No.1

January - February 2003

Physical Sciences. Pages 1-32  
Biological Sciences. Pages 33-69  
Technology. Pages 70-72

Published bimonthly by  
Scientific Information Centre  
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH  
Karachi

## MIXED LIGAND TRANSITION METAL COMPLEXES OF TRIDENTATE SCHIFF BASE WITH THIOCYANATE

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(Received 17 April 2001; accepted 27 November 2001)

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A tridentate Schiff base  $C_{13}H_{20}N_2O$  having ONN donor sequence has been synthesised from the condensation of 1,6-diaminohexane with salicylaldehyde. Several new thiocyanato complexes of Cu (II), Pd (II), Ti (III) and V(IV) containing the above ligand have been synthesised and characterized by elemental analyses, conductivity, magnetic measurements, IR and NMR spectra and electronic spectroscopic studies. Magnetic and spectral data support the octahedral geometries for Ti (III) and V(IV) complexes, whereas Cu(II) and Pd(II) complexes are square-planar in nature.

**Key words:** Thiocyanato complexes of Schiff base, Mixed ligand, Transition metal.

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## PREPARATION AND CHARACTERIZATION OF ACTIVATED CARBON FROM BABUL (*ACACIA ARABICA*) AND COCONUT SHELLS BY PHYSICAL ACTIVATION IN A FLUIDIZED BED REACTOR

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(Received 8 June 2000; accepted 2 January 2002)

Two indigenous raw materials Babul (*Acacia arabica*) and coconut shells were subjected to physical activation for the preparation of activated carbon by a mixture of superheated steam and air in a S.S. fluidized bed reactor. The influence of various operational variables like particle size of the two raw materials, time of activation and pressure of the fluidizing gas on different physical and chemical properties of the Granular Activated Carbon (GAC) samples was investigated. Different operational parameters being optimized in this study were particle size of 1.00 – 2.00 mm, operating pressure of 20 psi in 75 min time of activation. Babul was however not found to be an appropriate precursor for preparing GAC, probably due to its low inherent strength, eventually resulting in quite low yield and ball pan hardness of GAC samples. Further it was concluded, that GAC in quite a good yield and adsorptive capacity in liquid as well as vapour phase systems and standard hardness was obtained from coconut shells and it was much superior, when compared with the product obtained from Babul.

**Key words:** Physical activation, Fluidized bed, Coconut shells, *Acacia arabica*, Operating variables.

## **QUALITY PARAMETERS OF SOME NATURAL RUBBER (NR) CLONES INDIGENOUS TO NIGERIA. II. IONIC CONTENT, STABILITY AND DEGRADATION RESISTANCE OF NATURAL RUBBER**

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(Received 4 March 2000; accepted 24 June 2002)

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The degradation resistance, protein content and the ionic analysis of the lattices of two local natural rubber (NR) clones (NNRL-Ilawe Ekiti) and NNRG-Igede Ekiti) and an international natural rubber clone (TJI-Malaysia) have been studied. The international clone (TJI) was observed to be more resistant to oxidative degradation than the local clones. The resistance of NR to oxidative breakdown was improved by oxalic and phosphoric acid additives and was found to be related to absolute temperature by an Arrhenius type of equation thereby allowing for the evaluation of the activation energy which is taken to be a measure of the degradation resistance of NR. The lattice of the international clone (TJI) appears superior to the lattices of the local clones examined, being of higher protein content, stability and degradation resistance.

**Key words:** Natural Rubber, Degradation resistance, Protein content, Ionic analysis.

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## **DIELECTRIC DISPERSIVE BEHAVIOUR OF SILICON MONO OXIDE THIN FILM SANDWICHED STRUCTURE ANNEALED AT DIFFERENT TEMPERATURES**

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(Received 11 April 2001; accepted 16 February 2002)

Dielectric properties of evaporated silicon mono oxide film sandwiched between aluminium electrodes have been studied in the frequency range from 0.1 Hz to 1MHz. The structures were prepared on glass slide by in situ deposition of aluminium through successive evaporation in vacuum of the order of  $10^{-5}$  torr. The structures were annealed at temperatures of 303 °K to 378 °K for five minutes and the effect of annealing is discussed. Dielectric parameters were measured by alternating current (A.C) impedance technique of Frequency Response Analyzer. The capacitance  $C'$  (permittivity), conductance  $G$  and the loss factor  $g''$  were found to depend on frequency and temperature, within high frequency range the capacitance varies very slowly, showing the dielectric dispersive nature and temperature independent at high frequencies. The experimental evidence on the frequency domain behaviour of this structure have been discussed. The results were best analyzed by comparing them with the power law frequency dependence curve which departs from Debye like dielectric behaviour. The a.c conductance  $G$  of such samples varies directly to  $(\omega^n)$ ,  $\omega$  being the circular frequency, and  $n$  is a number, which is less than one and is a temperature dependent quantity. The slope of loss curve is not symmetrical with the loss peak. It is emphasised that these experimental results cannot be analysed in terms of quantum hopping conduction mechanism proposed by Johnschiere. The aim of this investigation is to study the dielectric response in the specific temperature range of deposited SiO films and to prepare initially the low cost Schottky diodes and other basic components.

**Key words:** Capacitance, Conductance, Loss factor, Power law, Frequency dependence.

## **NATURAL RUBBER LOADED WITH LOCAL MATERIALS. III. CREEP PROPERTIES**

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(Received 21 August 2001; accepted 20 February 2002)

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The creep properties (creep rate, creep modulus, creep compliance and tensile creep) of natural rubber loaded separately with local clay, limestone, silica-sand and charcoal have been examined as a function of filler loading, filler particle size, stress level and temperature. Results reveal that creep rate increases with increasing loading, stress level and temperature. The clay loaded composites show lower creep rate and energy to resist deformation than for composites loaded with limestone, silica sand and charcoal. Clay therefore shows a clear advantage over limestone, silica-sand and charcoal in creep deformation resistance when used as fillers in natural rubber.

***Key words:*** Creep properties, Local materials, Natural rubber composite, Filler loading, Stress level, Temperature.

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## SYNTHESIS OF 2', 4'-DIHYDROXY-6'-METHOXY-3, 4-METHYLENEDIOXYDIHYDRO CHALCONE AND 2', 4', 6'-TRIHYDROXY-4-METHOXYDIHYDROCHALCONE

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(Received 24 June 2000; accepted 28 March 2002)

The world of nature abounds in organic compounds of every conceivable structural classes. Every year Organic Chemists isolate and characterize a lot of compound from medicinal plants all over the World. The isolation and characterization of 2', 4'-dihydroxy-6'-methoxy-3, 4-methylenedioxy dihydrochalcone reported in 1990 from the bark of *Iryanthera sagotiana* (Benth.) Warb. In 1997 the isolation and characterization of 2', 4', 6'-trihydroxy-4-methoxydihydrochalcone from the woody part and the ripe fruit of *Iryanthera Laevis* reported. The syntheses of these two dihydrochalcones have not been reported yet. In this paper we wish to report the syntheses of the above two dihydrochalcones by Claisen – Schmidt reaction and other subsequent steps.

**Key words:** *Iryanthera sagotiana*, Myristicace, Dihydrochalcone.

## ***Short Communication***

*Pak J Sci Ind Res 2003 46(1) 31-32*

# **SYNTHESIS OF KARANJIN, NATURALLY OCCURRING FURANOFLAVONE**

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(Received 30 August 2001; accepted 16 February 2002)

# Biological Sciences

*Pak J Sci Ind Res 2003 46(1) 33-42*

## IDENTIFICATION OF THE MORPHOLOGICAL CHARACTERS INFLUENCING THE INFESTATION RATE OF YELLOW STEM BORER

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(Received 22 March 2000; accepted 18 September 2000)

Resistance of twenty one aus and eleven aman varieties of rice to yellow stem borer (YSB) infestation in relation to their morphological characters were determined. Different morphological characters varied significantly among test varieties. In aus season stem diameter, leaf number, flag leaf length and width, 2<sup>nd</sup> leaf length and width and life duration of rice plant induced YSB infestation but greater plant height, increased tiller number and leaf macro hairs reduced the infestation rate. The combined influence of these ten independent variables on YSB infestation was 64 percent. In aman season the correlation values indicated that wider stem, increased tiller number, greater flag leaf length and width and wider 2<sup>nd</sup> leaf induced higher infestation. On the other hand, longer plant, more leaf number, the greater 2<sup>nd</sup> leaf length, more leaf hairs and increased life duration of plant decreased YSB infestation rate. The combined influence of these seven independent variables on YSB infestation was 85 percent. These findings are indicative of the existence of potential sources of resistance in different rice varieties. Incorporation of such resistance factors in commercial rice varieties will be of immense importance in preventing losses by YSB and in reducing YSB population cumulatively.

**Key words:** Rice variety, YSB infestation rate, Morphological characters, Resistance, Quantitative relationship.

## **MONITORING OF PESTICIDE RESIDUES IN HUMAN MILK**

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After establishing proper analytical methodology for multiple pesticide residues, cotton-growing areas of Multan Division of Pakistan were surveyed and 40 samples of human milk from cotton pickers were collected during two crop seasons. Screening of these samples showed 72.5% contamination with 19 different pesticides/metabolites. The most frequently occurring pesticides were DDT and its metabolites, dimethoate, cyhalothrin, monocrotophos, profenofos and quinalphos.

**Keywords:** Pesticide residues, Human milk, Pakistan.

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## PRODUCTION AND SOME IMPORTANT PROPERTIES OF A PARTIALLY PURIFIED RENNIN-LIKE EXTRACELLULAR ENZYME FROM *FUSARIUM SUBGLUTINANS* (WOLLENWEBER & REINKING) NELSON *et al* GROWN STATICALLY

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Production of rennin-like extracellular enzyme was studied in static cultures of *Fusarium subglutinans*. Maximum production (648.5 SU/ml) was obtained at 30°C, pH value of 4.5, after 7 days of incubation where the fermentation medium was composed of 2% w/v, wheat flour. Production of this enzyme is assumed to be growth-associated type. Iso-propanol at the ratio of 1:1 (v/v) among different precipitating agents was selectively used to obtain partially purified enzyme that retains 28.37% of its original activity with 2.28-fold purification. Such partially purified enzyme was found active maximally at 55°C and pH value of 6.0 and was stable below 55°C for 60 min and in the pH range of 3.5 to 4.5 for 60 min.

**Key words:** *Fusarium subglutinans*, Rennin, Enzyme.

## POPULATION SIZE OF RED JUNGLEFOWL (*GALLUS GALLUS SPADICEUS*) AGRICULTURE AREAS

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(Received 30 April 2001; accepted 5 March 2002)

A two-year study was conducted on the population size of Red Junglefowl (*Gallus gallus spadiceus*) in five agricultural areas in the state of Selangor, Peninsular Malaysia. In the first year (from August 1995 to July 1996) the study was conducted in three habitats viz. rubber plantation, 22-year old oil palm plantation and orchard area at Universitiy Putra, Malaysia. In the second year (from August 1996 to July 1997) two additional habitats viz. 4 and 8 years old oil palm plantation at Sungai, Sedu Estate were selected. Red Junglefowl density was estimated by Distance Sampling Method. Habitat condition was also assessed to determine factors that affected the population size. The densities in 4 years, 8 years and 22 years old oil palm, rubber plantations and orchard were 84.22 km<sup>-2</sup>, 27.80 km<sup>-2</sup>, 21.43 km<sup>-2</sup>, 15.66 km<sup>-2</sup> and 6.06 km<sup>-2</sup> respectively. The average group size was two birds per group. The largest group comprised of 10 birds was observed in an 8 years old palm oil plantation. The height of the canopy cover was found to have a significant effect on the density of Red Junglefowl. Low canopy cover provides the Red Junglefowl protection against predators and suitable roosting sites.

**Key words:** Agriculture, Red Junglefowl, Density, Habitat, Canopy cover.

## UTILIZATION OF SEABUCKTHORN FRUIT FOR THE PREPARATION OF GRANULES

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(Received 6 April 2002; accepted 6 July 2002)

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Seabuckthorn preserved fruit pulp of 11.8 °Brix, procured from "Skardu", was utilized for the preparation of granules. Various parameters of the process such as concentration of the pulp, temperature and time of drying, pH of concentrate, effect of various stabilizers and their concentration were optimized. Physico-chemical characteristics, nutritional and microbiological analyses of the pulp and the granules prepared were carried out. The product prepared from the pulp of 66 °Brix dried in cabinet dryer at 50 °C for 6 h resulted in the form of orange coloured granules which possessed a good taste, natural flavour and contained almost all the nutrients present in the fresh pulp.

**Key words:** Seabuckthorn granules, *Hippophae rhamnoides*, Medicine.

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## GENETIC DISTANCE AND ITS RELATION TO THE PERFORMANCE OF INTRAHIRSUTUM $F_1$ HYBRIDS

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(Received 22 November 2000; accepted 7 May 2002)

Present study was initiated to determine as how far genetic distance is important in the expression of heterosis in some cotton leaf curl virus resistant and other intrahirsutum  $F_1$  hybrids. Three sets of hybrids were developed: 1) highly adapted Cotton Research Institute Sakrand (CRIS) lines crossed with exotic lines, 2) CRIS lines crossed with Cotton Research Institute Multan (CIM) lines, 3) the CRIS lines crossed with CRIS lines. For seed cotton yield, number of bolls formed and fibre length, the hybrids developed from exotic lines expressed more percent of heterosis than hybrids obtained from the crosses of CRIS with CIM or CRIS with CRIS lines that suggested that genetic distance is very important in the expression of heterosis for these traits. The average better parent heterosis of Exotic, CIM, and CRIS hybrids respectively were; 10.6, 42.2 and 22.8 for seed cotton yield, 77.1, 44.3 and 25.2% for number of bolls and 5.8, 4.8 and 4.6% for fiber length. In respect to lint%, all the three sets of hybrids expressed negative mean heterosis whereas for seed index, CRIS x CIM hybrids expressed mean heterosis of 13.5% against 4.7% of CRIS x Exotics and 3.3% of CRIS x CRIS hybrids. Considering the performance of individual hybrids, CRIS-121 x CP-15/2 which gave maximum yield of 146.5 also produced highest bolls of 52.1, whereas hybrid CRIS-168 x CIM-443 ginned maximum of 38.8% lint also gave highest seed index of 7.8 gm and for fibre length, CRIS-121 x CIM-443 produced longer fibre of 29.2 mm.

**Key words:** Genetic distance,  $F_1$  hybrids, Heterosis, *Gossypium hirsutum* L.

## ***Short Communication***

*Pak J Sci Ind Res 2003 46 (1) 68-69*

# **NUTRITIONAL AND TECHNOLOGICAL EVALUATION OF WHEAT BREAD SUPPLEMENTED WITH PEANUT AND SOY- BEAN FLOURS**

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(Received 14 June 2001; accepted 16 February 2002)

*Wheat breads supplemented with different oilseed flours*